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10/536,637

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Josephus Arnoldus Henricus Maria Kahlman

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EXAMINER

JUNG, UNSU

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,637	Applicant(s) KAHLMAN ET AL.	
	Examiner UNSU JUNG	Art Unit 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments in the reply filed on May 29, 2008 have been acknowledged and entered. The reply included amendments to claim 1.

Status of Claims

2. Claims 1-8 are pending and currently under consideration for patentability under 37 CFR 1.104.

Rejections Withdrawn

3. The following prior art rejections have been withdrawn in view of the amended independent claim 1 in the reply filed on May 29, 2008:

- Rejection of claims 1, 4, 5, and 8 under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000);
- Rejection of claim 2 under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Hirt (U.S. Patent No. 5,926,301, July 20, 1999); and
- Rejection of claim 6 under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et

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al. (U.S. Patent No. 6,084,503, July 4, 2000) as applied to claim 1 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 3, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000).

Oyama et al. teaches a device (quartz crystal microbalance, QCM) comprising a sensor element (having biomolecular binding sites for a biomolecule, see entire document, particularly Abstract and Fig. 1) connected to an external oscillating circuit adapted to resonate with the frequency inherent in the quartz plates (column 1, line 64-column 2, line 3). This frequency is related to the mass of quartz as well as the mass, viscosity and viscoelasticity of the electrodes, which are in contact with the quartz. Generally, the variation of resonant frequency (f) and that of mass of a substance in contact with quartz are correlated. This device provide for both DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency (column 2, lines 43-57).

With respect to claims 4 and 5, Oyama et al. teaches a sensor element, which forms a part of a voltage (V) or current (I) supplying circuit (oscillating circuit), coupled to the resonance frequency circuit (column 1, line 64-column 2, line 3), wherein the V/I of the supplying circuit is dependent on the physical property of the sensor element, and

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the resonant frequency (f) of the resonance circuit is dependent on the V/I (column 6, line 60-column 7, line 19).

With respect to claim 8, Oyama et al. teaches a sensor element formed on the surface of an on-chip SAW resonator can be used for detection of DNA (column 5, line 63-column 6, line 7).

However, Oyama et al. fails to teach a device comprising a remote power transmission element for receiving a resonant frequency. Oyama et al. further fails to teach a device, wherein a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit is separate from the remote power transmission element, which comprises a coil for receiving RF power whereby the remote power transmission element is arranged for receiving an RF frequency different from the resonant frequency.

With respect to claim 1, Ruile et al. teaches a radio-interrogated surface wave technology sensor (see entire document, particularly Abstract), wherein a radiofrequency (RF) transmitter and receiver having transmission and reception antennas, with an electronic evaluation device (circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit), which is used for qualitative/quantitative evaluation of a change in the response of the surface-wave sensor and for receiving power transmitted from a remote RF transmitter (column 2, lines 30-50).

With respect to claims 1 and 3, Ishikawa et al. teaches a wireless power transmitting element (external control station) for transmitting power to another wireless

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power transmitting element in a circuit provided in a biosensor device (see entire document, particularly p15, lines 3-17 and Fig. 11). The power is transported either by radiofrequency (RF) radiation or by magnetic coupling between the control system antenna/coil and the biosensor antenna/coil (p15, lines 5-17). Using the RF transmissions, the biosensor can be interrogated individually, or as groups (p14, line 27-p15, line 1).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. with a remote RF transmitter and receiver having transmission and reception antennas with a circuit for RF communication of an RF signal in dependence of the resonance frequency of the resonant circuit as taught by Ruile et al. in order to provide a remote power source and interrogation device for DNA detection and quantitative measurement of test DNA in a sample on the basis of the variation in resonance frequency.

The advantage of transmitting and receiving detection signals (resonance frequency of the sensor element) remotely provides the motivation to employ the remote RF transmitter and receiver device of Ruile et al. in the device of Oyama et al. with a reasonable expectation of success as the remote RF transmitter and receiver device of Ruile et al. can be used in devices comprising different types of sensor elements including a SAW resonator, which is used in biosensor applications to identify or quantitatively measure chemical/biological substances.

In addition, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to include in the system of Oyama et al. in view of Ruile

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et al. with a remote power transmitting element comprising a coil as taught by Ishikawa et al. in order to wirelessly transmit power to a biosensor device to interrogate individual or groups of biosensors.

The advantage of transporting wireless power in a biosensor device with ability to interrogate individual or groups of biosensors provides motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success since wireless power allows elimination of need for connecting each biosensor with power devices for conducting assays on the biosensor.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000) as applied to claim 1 above, and further in view of Hirt (U.S. Patent No. 5,926,301, July 20, 1999).

Oyama et al. in view of Ruile et al. and Ishikawa et al. teaches a device as set forth above. However, Oyama et al. in view of Ruile et al. and Ishikawa et al. fails to teach a device, wherein the remote power transmission element comprises a photodiode.

Hirt teaches remote devices such as light emitting diodes and photodiodes, which are usually smaller than radio-frequency antennae (see entire document, particularly column 1, lines 26-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. and

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Ishikawa et al. with a photodiode as a remote power transmission element as taught by Hirt in order to use a small remote power transmission element to be incorporated in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. The advantage of employing remote power transmission element, which is smaller, provides the motivation to combine teachings of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success as smaller remote power transmission elements of Hirt would be advantageous for devices of Oyama et al. having small dimensions (minute size, Example 5).

9. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oyama et al. (U.S. Patent No. 5,552,274, Sept. 3, 1996) in view of Ruile et al. (U.S. Patent No. 6,084,503, July 4, 2000) and Ishikawa et al. (WO 00/66781, Nov. 9, 2000) as applied to claim 1 above, and further in view of Hardman et al. (U.S. Patent No. 6,592,820, Filed Nov. 5, 1998).

Oyama et al. in view of Ruile et al. and Ishikawa et al. teaches a device as set forth above. Ruile et al. further teaches that variety of sensor elements (sensitive elements) can be employed with the remote RF transmitter and receiver including magnetoresistors (column 2, lines 56-63). However, Oyama et al. in view of Ruile et al. and Ishikawa et al. fails to teach a device, wherein the sensor element (71) is magnetoresistive element provided in a bridge configuration.

With respect to claims 6 and 7, Hardman et al. teaches that a conventional biochemical assay may include a detection of microscopic paramagnetic particles

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(PMPs) bound to a GMR sensor by specific intermolecular recognition bonds (see entire document, particularly column 1, lines 34-37). PMPs are detected as a difference in the resistance of a GMR sensor having a bound PMP compared to a reference GMR sensor having no bound PMP (column 1, lines 37-40). A plurality of sensors is arranged in an array coupled to a differential amplifier (column 2, lines 32-34). Each addressed cell is coupled in a bridge circuit to the differential amplifier, which provides a signal, which is in the form of frequency and conveys indicia of the resistance of each sensor. For proper operation, GMR elements require a current passing through the respective elements (column 17, lines 20-24).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include in the device of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a GMR sensor comprising GMR elements coupled to a bridge circuit as taught by Hardman et al. in order to provide GMR sensor with power via a wireless power transmitter for conducting biochemical assays using microscopic paramagnetic particles.

Further, Oyama et al. in view of Ruile et al. and Ishikawa et al. meets the limitations of claims 6 and 7 except that it employs a SAW resonator rather than a magnetoresistive element (resistive elements provided in a bridge configuration) in order to detect an analyte in a sample using biochemical/binding assays. However, because these two elements were art-recognized equivalents at the time of the invention in the remote power transmission applications where it is immaterial whether a SAW resonator or a magnetoresistive element is used for detecting an analyte in a

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sample using biochemical/binding assays, one of ordinary skill would have found it obvious to substitute a magnetoresistive element (resistive elements provided in a bridge configuration) for the SAW resonator of Oyama et al. in view of Ruile et al. and Ishikawa et al. with a reasonable expectation of success.

Response to Arguments

10. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Since prior art fulfills all the limitations currently recited in the claims, the invention as currently recited would read upon the prior art.

Conclusion

17. No claim is allowed.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to UNSU JUNG whose telephone number is (571)272-8506. The examiner can normally be reached on M-F: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Unsu Jung/
Unsu Jung, Ph.D.
Patent Examiner
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